

# Effects of nicotine on serial memory search

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Two studies are described in which the effects of smoking a nicotine versus non-nicotine cigarette on performance on Sternberg's serial memory search task was compared. The memory search task involves subjects being shown a short list of digits and then being presented with digits one at a time and being asked to indicate as quickly as possible in each case whether this "probe" was a member of the "positive set" which they had previously seen. As a positive set size increases there is a linear increase in response times. In the version of the task used for the present studies positive set sizes of 2 and 5 were used. In the first study, a group of 10 occasional smokers performed the memory search task. Occasional smoking was defined as less than 5 cigarettes per day on average and at least one day per week without smoking at all. Having been tested on the task the subjects smoked either a nicotine or non-nicotine cigarette. After this, they performed the search task again. Then they smoked either a non-nicotine or nicotine cigarette (whichever one they had not smoked before) and their memory search performance was tested again. The results indicated that the search rate (the estimated time taken to match the probe digits with their stored representation of each item in positive set) was significantly faster after the nicotine cigarette than the non-nicotine cigarette.

A second study was carried out to confirm and extend this finding. A group of 14 occasional smokers and 15 regular smokers underwent the same testing protocol as was used in the first study. In both groups the tests were carried out before and after a period of 24 hours' abstinence from cigarettes. The occasional smokers experienced no significant withdrawal symptomatology and scored low on the dependence subscale of Russell's smoking motivation questionnaire. The results indicated as before that the search rate was faster after the nicotine versus non-nicotine cigarette and that there was no significant difference attributable to withdrawal state or between regular and occasional smokers.

The results indicate that smoking a cigarette containing nicotine can speed processing involving short-term memory and that this effect does not appear to be subject to significant chronic or acute tolerance under normal smoking regimes.

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